

## **Substitute Specification**

Attorney Docket: 3883.022

Patent Application

**SOCKS**

[0001] This application is a national stage of PCT/JP2002/006716 filed July 3, 2002 under the International Convention.

**BACKGROUND OF THE INVENTION****Field of the Invention:**

[0002] This invention relates to socks, and particularly to socks that have little feeling of constriction when worn.

**Description of the Related Art:**

[0003] Generally, a sock as shown by reference number 1 in Fig. 10 comprises: a tubular knit section 2 that has a foot-insert section 2a and that extends from near the ankle of the foot to the instep and arch of the foot; and a toe section 3 that is connected to the tubular-knit section 2 in a tapering shape and covers the toes, and where particularly, as shown in Fig. 11, this toe section 3 comprises a sole section 3a that covers the lower half of the toes, and a instep section 3b that covers the upper half of the toes, and the sole section 3a and instep section 3b are formed into a flat tubular shape and closed on the tip end by knitting them together into a flat shape.

[0004] In the case of this kind of conventional sock 1, when inserting the foot through the foot-insert section 2a and inserting the toes into the toe section 3, the toes must be inserted into

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the sole section 3a and instep section 3b of this toe section 3 while deforming them into a tubular shape.

[0005] Therefore, particularly, the wearer feels a tight fit around the toes in the tapered toe section 3, and after the sock is put on, feels constriction around the toes.

[0006] Taking this kind of problem into consideration, the object of this invention is to provide a sock that particularly loosens the fit in the tapered toe section, and reduces the feeling of constriction after the sock is put on.

**SUMMARY OF THE INVENTION**

[0007] The sock of this invention is a sock comprising a toe section that covers the toes, and a bulge section in the middle section of the toe section that bulges in the vertical direction of the toes.

[0008] With this kind of construction, when the toes are inserted into the toe section, this toe section deforms easily along the toes due to the bulge section.

[0009] As a result, when putting the sock on, the toes can be inserted smoothly, and after the sock is put on, there is space around the toes due to the bulge section, and thus it is possible to

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avoid a feeling of excessive constriction.

[0010] Here it is preferred that the bulge section becomes gradually thinner going from the side of the large toe toward the side of the small toe.

[0011] In the sock of this invention, the bulge section is formed in the section that covers the lower half or the upper half of the toes.

[0012] By using this kind of construction, it is possible to make the shape of the toe section after the sock has been put on close to the shape of the toes, and thus it is possible to further improve the fit and feeling of constriction.

[0013] Moreover, it is also possible to form the bulge section where it will cover the lower half of the toes and the upper half of the toes, and this makes it possible to improve the fit and feeling of constriction even more.

[0014] Also, in the sock of this invention, the toe section is divided into a first insert section where the large toe is inserted, and a second insert section where the other toes are inserted, and bulge sections are formed in both the first insert section and second insert section.

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[0015] With this kind of construction, it is possible to maintain the function of improving the fit and feeling of constriction described above, and since the toe section is located between the large toe and other toes, shifting of the toe section and toes is suppressed, and thus it is possible to improve the fit.

[0016] Furthermore, the sock of this invention is formed by dividing the toe section into five insert sections into which the toes are individually inserted, and forming bulge sections in each of these five insert sections.

[0017] With this kind of construction, it is possible to maintain the function of improving the fit and feeling of constriction described above, as well as further improving the function of suppressing shifting of the toes in the toe sections, and thus it is possible to improve the fit even more.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0018] Fig. 1 is a vertical cross-sectional view showing the toe section of a first embodiment of the invention.

[0019] Fig. 2 is a side view of the toe section of a first embodiment of the invention.

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[0020] Fig. 3 shows the toe section of a first embodiment of the invention, and is a side view showing the state of deformation when the sock is worn.

[0021] Figs. 4 is vertical cross-sectional views of other examples of the toe section of this invention.

[0022] Fig. 5 is a vertical cross-sectional view of yet another example of the toe section of this invention.

[0023] Fig. 6 is a vertical cross-sectional view of even yet another example of the toe section of this invention.

[0024] Fig. 7 is an external pictorial view of another example of this invention.

[0025] Fig. 8 is a vertical cross-sectional view of the toe section of Fig. 7.

[0026] Fig. 9 is an external pictorial view of another example of the invention.

[0027] Fig. 10 is an external pictorial view of a typical sock.

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[0028] Fig. 11 is a sectional view along the line I-I of Fig. 10.

### DESCRIPTION OF THE DRAWINGS

[0029] In order to explain the invention in more detail, it will be explained with reference to the accompanying drawings.

#### [0030] First Embodiment

[0031] Fig. 1 to Fig. 3 show the toe section 10 of the sock of a first embodiment of the invention, where Fig. 1 is a vertical cross-sectional view of the toe section 10, Fig. 2 is a side view of the toe section 10 and Fig. 3 is a side view when the sock is worn; and the other parts are common with those shown in Fig. 10 so they will be explained using Fig. 10 and the reference numbers used in Fig. 10.

[0032] This embodiment is characterized by forming a bulge section 11 in the middle part of the toe section 10 that is formed such that it continuous with the end section of the tubular knitted section 2.

[0033] The toe section 10 is knitted completely into a flat tubular shape and comprises a sole section 10a that covers the bottom part of the toes and the instep section 10b that covers the top

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part of the toes.

[0034] Moreover, in this embodiment, the bulge section 11 is formed in the middle part in the lengthwise direction of the toes in the sole section 10a, and when knitting this sole section 10a, and with the knitting location held fixed, the knitting needles are gradually decreased, after which they are gradually increased.

[0035] Furthermore, the bulge section 11 is formed such that it is a simple arc shape that protrudes downward.

[0036] In the case of the sock of this embodiment that is constructed in this way, when putting on the sock and the toes are inserted into the toe section 10, the toe section 10 is stretched and deformed in the front and back direction as well as the up and down direction.

[0037] Also, as shown in Fig. 3, by forming a bulge section 11 in the sole section 10a, the sole section 10a deforms in correspondence to the inserted toes.

[0038] Therefore, when inserting the toes into the toe section 10, the resistance to the insertion is reduced, and a good fit is obtained, and since there is little stretching in the bulge section 11 after being put on, the constrictive force applied to the toes is reduced, and as a result, the feeling



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of constriction is reduced and a comfortable fit is obtained.

[0039] On the other hand, an example of forming the bulge section 11 into a simple arc shape was described, however, instead of this, it is also possible for the bulge section to be a trapezoidal shape as shown in Fig. 4A.

[0040] Also, as shown in Fig. 4B, it is also possible to form the bulge section 11 such that it gradually becomes thinner in the direction from the large toe to the small toe, and with this kind of construction, the bulge section corresponds to the shape of the toes and improves the fit and feeling of constriction even more.

[0041] Moreover, these bulge sections 11, 12 can be formed in not only the sole section 10a, but as shown in Fig. 5 and Fig. 6, can also be formed in the instep section 10b, or furthermore, could be formed in just this instep section 10b.

[0042] Also, as in the toe section indicated by reference number 13 in Fig. 7, this toe section 13 can be formed such that it is divided into a first insert section 14 into which the large toe is inserted, and a second insert section 15 into which the other toes are inserted, and as shown in Fig. 8, a bulge section 11 can be formed into both the first insert section 14 and second insert section 15.

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[0043] By forming a first insert section 14 and second insert section 15 in the toe section 13 like this, and by holding the toe section between the large toe and the adjacent toe, it is possible to suppress shifting of the toes in the toe section 13 and to improve the fit.

[0044] Also, as in the toe section indicated by the reference number 16 in Fig. 9, this toe section 16 is formed such that it is divided in first to fifth insert sections 17 to 21 that correspond to each of the toes; and even though not shown in the drawings, it is also possible to form a bulge section in each of these insert sections 17 to 21.

[0045] With this kind of construction, while maintaining the fit described above, each toe is independently covered so it is possible to eliminate sweating and the like, and make wearing the sock more comfortable.

[0046] Also, in the case where insert sections 17 to 21 that correspond to the toes are formed, resistance to the insertion of the toes is increased, however, in this invention, since bulge sections are formed in each of the insert sections to 17 to 21, the aforementioned insert resistance is reduced, the sock can be put on smoothly.

[0047] Furthermore, the insert section described above could also be an insert section for an arbitrary number of toes that covers from the index toe (second toe) to the next to the last toe

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(fourth toe).

[0048] Also, the tubular knit section 2 described above could be changed among various shapes such as a shape that covers the calf, a shape that covers the ankle, or a shape that covers to just below the ankle.

## [0049] Industrial Applicability

[0050] As described above, with this invention, by forming a bulge section that runs along the vertical direction of the toes in the middle section of the toe section that covers the toes, when inserting the toes, this toe section deforms easily along the toes, and as a result, the toes can be inserted smoothly when putting the sock on, and after the sock has been put on, the bulge section forms space around the toes, so it is possible to avoid a feeling of excessive constriction.

## [0051] Description of Reference Numbers

1. sock
2. tubular knitted section
  - 2a. foot-insert section
3. toe section
  - 3a. sole section
  - 3b. instep section

{WP320955.1}

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- 10. toe section
- 10a. sole section
- 10b. instep section
- 11. bulge section
- 12. bulge section
- 13. toe section
- 14. first insert section
- 15. second insert section
- 16. toe section
- 17. first insert section
- 18. second insert section
- 19. third insert section
- 20. fourth inset section
- 21. fifth insert section